Digital Decade Country Report 2023

Spain

Introduction

Spain is expected to make a positive contribution to the collective efforts to achieve the EU's Digital Decade targets, given its large population share in the EU, and its dynamic evolution on digital transformation. The Spanish authorities have made significant endeavours in recent years, laying the foundation for an ambitious digital transformation of the Spanish economy. Spain is making significant progress in all four dimensions to address its main digital challenges.

Spain presented the 'Digital Spain 2026' strategy in 2022 as an update of the previous 'Digital Spain 2025'. The aim of the strategy is to promote the country's digital transformation through a set of reforms and significant public and private investments, aligned with the EU's Digital Decade Policy Programme and the European Declaration on Digital Rights and Principles for the Digital Decade.

Spain is collaborating with other Member States in exploring the possibility to establish **European Digital Infrastructure Consortium (EDICs)** on: (i) the Alliance for Language Technologies, to develop a common infrastructure in the field of natural language processing and to develop large multi-language models; (ii) Genome, to enable effective and secure cross-border access to repositories of personal genomic datasets; (iii) and the Networked Local Digital Twins Towards CitiVerse project, using disruptive and immersive technologies for future city related projects.

On the promotion of digital rights to put people at the centre of the digital transformation, following adoption of the Charter of the Digital Rights in July 2021 Spain has been taking the lead on this issue in international forums such as the OECD and the General Secretariat for Ibero-America, which recently adopted the Ibero-American Charter of Digital Rights.

Digital in Spain's Recovery and Resilience Plan (RRP)

Spain's RRP, with a total budget of up to EUR 69.5 billion in transfers, contains an ambitious set of reforms and investments in digital and assigns 28.2% of the allocation to digital (EUR 19.6 billion), including an expected EUR 18.8 billion[1] to help meet the Digital Decade targets.

In the context of the payment of the first RRF instalment, Spain satisfactorily fulfilled 52 milestones and targets. A number of them were related to measures in the area of digital and notably concerned major reforms and strategies to facilitate the digital transition of Spain's economy and society (i.e. the adoption of the Digital Spain 2025 strategy; the National Digital Competences Plan; the strategy for the promotion of 5G technology; the SME Digitalisation Plan 2021-2025; the national AI strategy; and the Plan for the Digitalisation of Spain's Public Administration 2021-2025).

For the second instalment, on 30 April 2022, Spain submitted to the Commission the payment request based on the achievement of 40 milestones and targets, including some relevant measures on: 1) 5G spectrum and deployment (i.e. assignment of the 700 MHz band and the legal act on 5G spectrum reduction taxation); 2) digital skills and education (#CompDigEdu, #EcoDigEdu and Royal Decree 640/2021); 3) adoption of eight agreements on supplementary R&D&I plans (Royal Decree

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[1] Each Recovery and Resilience Plan must assign at least 20% of its total allocation to digital objectives. The plans therefore had to specify and justify to what extent each measure contributes fully (100%), partly (40%) or not at all (0%) towards digital objectives, using Annex VII of the RRF Regulation. Combining the coefficients with the cost estimates of each measure makes it possible to assess to what degree the plan contributes to digital objectives and whether it meets the 20% target. Furthermore, a further qualitative assessment of the data took place to make it possible to estimate the possible contribution of RRF measures to the Digital Decade targets. The information provided refers to the Recovery and Resilience Plan as adopted by the Council before 1 September 2023, without prejudice to potential ongoing revisions of the plan.

991/2021 of 16 November 2021 and Royal Decree 287/2022 of 19 April 2022); and 4) Spain's Charter of Digital Rights.

On the third instalment, on 11 November 2022, Spain submitted to the Commission the payment request based on the achievement of the 29 milestones and targets, including the entry into force of Spain's General Telecommunications Law 11/2022 of 28 June; General Audiovisual Communication Law 13/2022 of 7 July 2022; Law 17/2022 of 5 September on Science, Technology and Innovation digitisation; and Organic Law 3/2022 of 31 March 2022 on the organisation and integration of vocational training. A measure on the promotion of major cultural services was also undertaken.
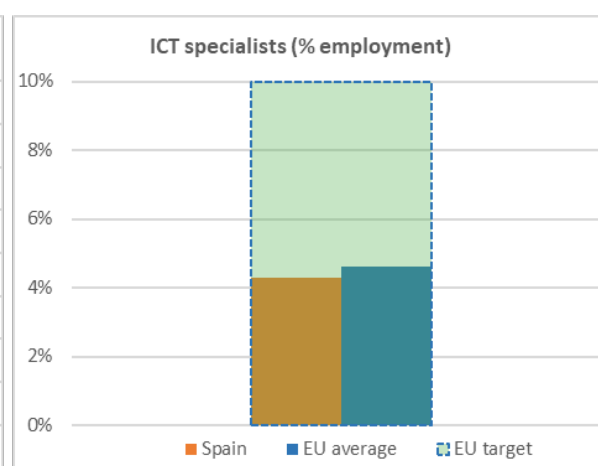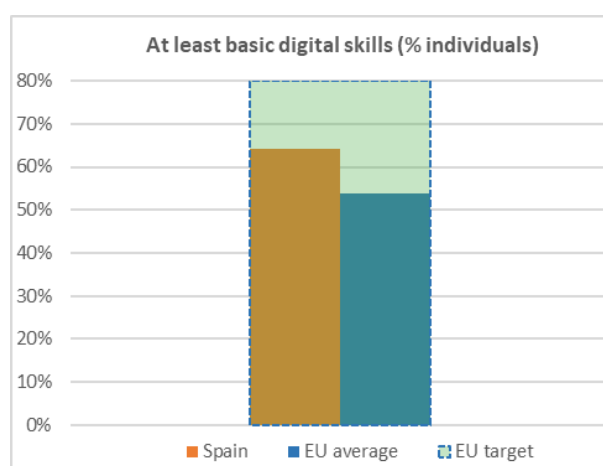
Regarding the 58 milestones and targets of the fourth instalment that are meant to be fulfilled in 2022[2], there is a wide range of digital measures such as: Royal Decree-Law 7/2022 of 29 March on 5G cybersecurity; the Start-up Law; the assignment of the 26 GHz band; the release of the National Cybersecurity Industry Support program; and the budget commitment of investments under both the Kit Digital and Agents of Change programmes; among other measures.

In June 2023, Spain submitted its addendum to the RRP (reinforcing its digital dimension) which is currently being reviewed by the Commission.

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[2] Compliance and fulfilment of the milestones and targets laid down in the fourth instalment will be assessed by the Commission once Spain formally submits the related payment request.

1 Digital skills

		Spain		EU	EU
	DESI 2021	**DESI 2022**	**DESI 2023**	**DESI 2023**	**2030 target**
1a1 Internet use	91%	92%	93%	89%	
% individuals	2020	2021	2022	2022	
1a2 At least basic digital skills	NA	64%	64%	54%	80%
% individuals		2021	2021	2021	
1a3 Above basic digital skills	NA	38%	38%	26%	
% individuals		2021	2021	2021	
1a4 At least basic digital content creation skills	NA	74%	74%	66%	
% individuals		2021	2021	2021	
1a5 Enterprises providing ICT training	20%	20%	21%	22%	
% enterprises	2020	2020	2022	2022	
1b1 ICT specialists	3.9%	4.1%	4.3%	4.6%	**20 million**
% individuals in employment aged 15-74	2020	2021	2022	2022	**~10%**
1b2 ICT graduates	4.2%	4.0%	4.8%	4.2%	
% graduates	2019	2020	2021	2021	

Spain performs well on digital skills, especially on 'at least basic' digital skills (64% of the population) and is making progress towards achieving the Digital Decade targets. However, efforts are still needed to equip more than one third of Spain's population with basic digital skills. Spanish users use regular internet (93%) and have at least basic digital content creation skills (74%). The percentage of enterprises providing ICT training (21%) is slightly below the EU average (22%) and the percentage of **ICT specialists (4.3%) is growing slowly in alignment with the path registered in the EU but is still below the EU average (4.6%)**. The lack of ICT specialists is partly being addressed as the percentage of ICT graduates has now increased significantly above the EU average (4.8% vs. 4.2%), thus contributing to narrowing the gap with their continuously growing demand. The share of women among the ICT specialists is at 18% just below the EU average.

Spain is currently implementing several measures that can further increase the level of basic digital skills. In November 2022, as part of the National Digital Competences Plan with a budget of EUR 3.7 billion, Spain presented the [Generation D Pact](#), an ambitious public-private initiative that is aimed to: 1) provide a public space for public-private cooperation to boost digital skills; 2) raise awareness on

how to overcome the digital divide; 3) make digital skills training and activities easily accessible; 4) promote digital skills certifications; and 5) foster cooperation between all levels of administration.

Some targeted plans have been launched on child, primary and secondary education. Following and complementing the Educa en Digital programme (approved in July 2020), Spain presented in November 2022 a digitalisation and digital skills plan for education #DigEdu that is focused on schools and all members of the education community and is based on four pillars: 1) development of digital education skills (schools, teachers and students); 2) digitalisation of the Education Centre and Centre's Digital Plan; 3) creation of educational resources in digital form; and 4) advanced digital methodologies and skills. Under this plan, and as part of component 19 ('Digital Skills') of Spain's RRP, Spain launched two *territorial cooperation programmes* in September 2021 to improve digitalisation in the education system: 1) #CompDigEdu to improve pupils' and teachers' digital skills, and to transform schools into digitally competent educational organisations (2021-2024); and 2) #EcoDigEdu to facilitate teachers' and pupils' access to digital means and to provide teachers with relevant training to use them (2021-2025). As a result, publicly supported schools will be equipped with at least 300 000 digitally connected devices and connectivity (enhancing previous measures under the *Educa en Digital* programme) and at least 240 000 classrooms will have new or upgraded interactive digital systems; at least 22 000 schools will develop their own digital strategies; and at least 700 000 teachers will receive digital skills training (over 80% of them will be certified). Spain also launched other initiatives in 2022 to improve the basic digital skills of children and, will in 2023 deploy a programme focused on people at risk of digital exclusion, including people over 65, people with disabilities, and vulnerable groups.

Public-private initiatives are also supporting efforts to increase basic digital skills in Spain. In the 2022 edition of Code Week, students participated in 923 activities across Spain (ranking 28th out of 78 countries), most of them (78%) in schools and attracting 59 937 participants (50% of whom were girls). Spain was also one of the six countries developing the Code Week School Label pilot and six Spanish schools were awarded a Code Week label of excellence.

Spain is currently implementing and developing several initiatives to increase the number of ICT specialists, both in the education system and business (upskilling and reskilling), since the need was already identified in the National Strategy for Artificial Intelligence, the Digital Agenda 2026 and the Spanish RRP.

As regards vocational education and training (VET), in March 2022, Spain adopted Organic Law 3/2022 of 31 March 2022 to modernise the VET system by 1) upskilling low skilled workers to improve their employability; 2) addressing skills mismatches; 3) updating the National Catalogue of Professional Qualifications to fit the future needs of the economy; and 4) improving the attractiveness of, and enrolment in, higher VET programmes. In April 2021, Spain published Royal Decree 279/2021 of 20 April, establishing a **VET specialisation course on AI and big data**. In June 2022, Spain approved the disbursement of EUR 87.5 million (as part of component 20 'Strategic Plan to Boost Vocational Training' of the Spanish RRP) to Spain's autonomous communities for the upskilling and reskilling through modular training of more than 160 000 workers over the year. These training courses will form part of a vocational training degree or a professional certificate. In addition, a network of 1 500 digital training centres vocational training is being set up within the *FP Digital Plan*. With an investment of EUR 29.5 billion, 1 050 digital training centres were already created at the regional level during 2022 and a further 510 will be added to these in the scope of local entities with funding of EUR 12.5 billion. In addition, further collaboration and coordination between education and businesses would help close the ICT specialist gap.

In higher education, Spain launched two calls in November 2022 to fund 32 academic chairs on both artificial intelligence and cybersecurity, in order to promote synergies between universities and
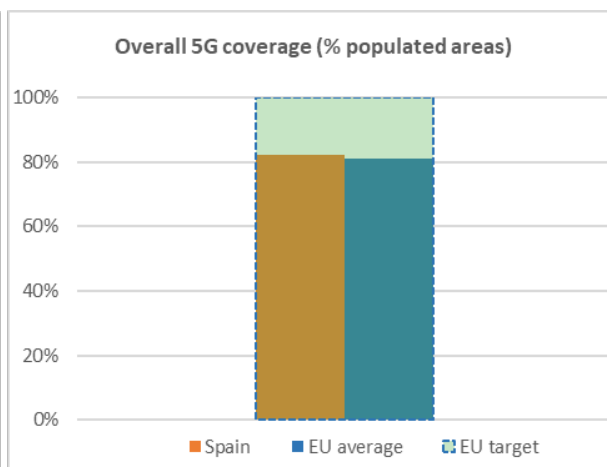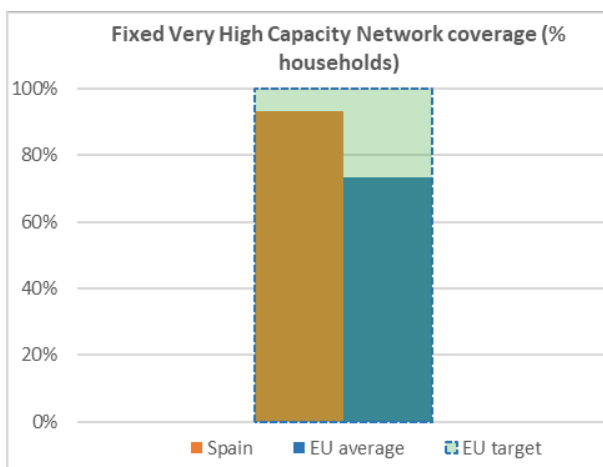
research centres through inter-university cooperation networks, as well as with companies and public administrations. The [Uni Digital Plan](), which was presented in 2021 (budget: EUR 142.85 million), aims to improve the digitalisation of the university system. Up to 16 agreements were signed in 2022 to deploy very high connectivity in academic and research centres.

> ***Spain should accelerate its efforts in the area of digital skills***, *notably in the upskilling and reskilling of the labour force, in particular, in advanced and emerging technologies, to address the lack of ICT specialists. Additionally, Spain should continue to encourage more students to specialise in ICT and promote diversity and a gender-balanced uptake of this subject, reducing any possible stereotypes in the teaching and learning of informatics.*[3]

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[3] The recommended policies, measures, and actions in this document reflect the Commission Communication 'Report on the state of the Digital Decade' COM(2023) 570.

2 Digital infrastructures

	Spain			EU	EU
	DESI 2021	DESI 2022	DESI 2023	DESI 2023	2030 target
2a1 At least 100 Mbps broadband take-up	**76%**	**83%**	**87%**	**55%**	
% households	2020	2021	2022	2022	
2a2 At least 1 Gbps broadband take-up	**<0.1%**	**<0.1%**	**14.6%**	**13.8%**	
% households	2020	2021	2022	2022	
2a3 Fixed Very High Capacity Network (VHCN) coverage	**92%**	**94%**	**93%**	**73%**	**100%**
% households	2020	2021	2022	2022	
2a4 Fibre to the Premises (FTTP) coverage	**85%**	**89%**	**91%**	**56%**	
% households	2020	2021	2022	2022	
2b1 Mobile broadband take-up	**85%**	**94%**	**94%**	**87%**	
% individuals	2018	2021	2021	2021	
2b2 Overall 5G coverage	**13%**	**59%**	**82%**	**81%**	**100%**
% populated areas	2020	2021	2022	2022	
2b3 5G spectrum	**65%**	**65%**	**98%**	**68%**	
Assigned spectrum as a % of total harmonised 5G spectrum	2021	2022	2023	2023	

Spain is making an important contribution to the EU's collective efforts to reach the Digital Decade targets in digital infrastructure. The country **is at the forefront of fibre deployment in the EU,** standing well above the EU average on fixed very high capacity network (VHCN) (93% vs. 73%), fibre to the premises (FTTP) coverage (91% vs. 56%), at least 100 Mbps fixed broadband take-up (87% vs. 55%), and at least 1 Gbps take-up (14.6% vs. 13.8%). Regarding overall 5G coverage, Spain is slightly above the EU average (82% vs. 81%), mainly due to initial delays in auctioning all the 5G pioneer bands, but has now assigned 98% of all the 5G pioneer bands. Spain is actively proceeding with the copper switch-off process, with the objective of ending copper usage in 2026.

Spain's share of semiconductors and cutting-edge technologies production is very low despite its high importance for semiconductor-intensive manufacturers (for example, Spain has the EU's second largest car manufacturer and a top electric domestic appliance manufacturer) and despite the fact

that it hosts one of the EU's leading supercomputing centres. However, Spain is taking steps to address this challenge, including by approving the PERTE Chip.

Spain is currently implementing several measures that can help increase the level of Gigabit and 5G network deployment, notably under component 15 ('Connectivity') in Spain's RRP.

Spain is one of the EU's best performers in digital connectivity despite its large area (the second largest in the EU) and complex orography; its high population (almost 48 million people) with very low population density in certain areas; and a fragmented and diverse regulatory framework at the local level (with different planning and permit regulations). The high degree of VHCN coverage was achieved mainly through private investment encouraged by a pro-investment regulation that has made a dynamic and competitive market possible. The digital divide between urban and rural areas has been reduced due to the increasing deployment of new access networks in rural areas by both the incumbent and the alternative operators, as well as due to subsidies for deployments in white and grey areas. However, differences between urban and rural areas still exist, and the country is a middle-of-the-range performer in 5G coverage, though coverage levels may be improved with the ongoing 700 MHz deployments. Market consolidation started right after the COVID-19 pandemic's outbreak and is ongoing. 5G and VHCN deployment continues to be based on private investment but is also supported by public investment, mainly RRF funding, especially in rural and low dense areas.

In June 2022, Spain adopted a new Telecommunications Law that transposes the European Electronic Communications Code (EECC). This law updated Spain's regulatory framework in the field with the aim of further promoting and facilitating VHCN investments. The law also introduces most of the best practices of the EU Connectivity Toolbox in order to facilitate and improve the rollout of fixed and mobile VHCN as well as to reduce network operators' costs of deployment. In March 2022, Spain adopted the Royal Decree-Law 7/2022 of 29 March on requirements to ensure the security of 5G electronic communications networks and services. This regulation incorporates into national regulation both the EU toolbox for 5G security and Commission Recommendation (EU) 2019/534 of 26 March 2019 on the cybersecurity of 5G networks.

The national regulatory authority for electronic communications services (CNMC) has adopted pro-competitive measures to encourage investment in VHCN, following the measures fostered through EU regulations. As a result of such measures, Spain is one of the Member States with the most co-investment agreements, access to physical infrastructure is widespread and a light-touch access regulation to VHCN (such as the European Commission Economic Replicability Test for active wholesale access products in less competitive areas) is applied. In this context, in 2022 the CNMC reviewed the conditions for accessing the largest operator's poles, which is key for deployment in less populated areas, and resolved a number of disputes regarding access to the largest operator's infrastructures and other stakeholders' infrastructure (based on the Broadband Cost Reduction Directive) setting relevant criteria for this area.

On 5G, all three pioneer bands have now been assigned since the 26 GHz band auction was completed on 21 December 2022 (following the auctions of the 700 MHz and 3.4-3.8 GHz bands in 2021 and 2018). The outcome was lower than expected and some spectrum was unassigned:1.8 GHz of the national spectrum (out of 2.4 GHz offered) and one regional licence (out of 38 offered) were awarded. Spain had reserved 450 MHz in the 26 GHz band for private networks. In order to accelerate 5G deployment, Spain has also launched: 1) a reduction of 5G spectrum taxation (introduced in Spain's Law 22/2021 of 28 December on the General State Budget for 2022, to be continued in 2023); 2) the Universalisation of Digital Infrastructures for Cohesion Programme ('UNICO') UNICO-5G Redes Backhaul (budget: EUR 450 million; launched in 2022) which promotes fibre optic backhaul connection for mobile sites in areas with fewer than 5 000 inhabitants (excluding those areas where 5G coverage obligations had been set out); and 3) the UNICO Sectorial 5G

programme (the first call budget was EUR 60 million; launched in February 2023; and the second call budget was EUR 15 million and launched in July 2023) to finance projects based on 5G technology that will have an impact in different sectors. The UNICO 5G Redes Activas programme was recently published, and will have a budget of more than EUR 500 million to deploy 5G active equipment in small underserved municipalities in areas that do not have 50 Mbps mobile coverage.

On broadband and Gigabit connectivity, Spain launched: 1) UNICO-Banda Ancha (the first two calls were launched in 2021 and 2022 with a budget of EUR 494 million; and a new call will be launched in 2023 with a budget of EUR 150 million) to provide fixed broadband networks (with symmetric 300 Mbps speed upgradeable to 1 Gbps) to up to 2 million premises located in rural, remote and less populated areas; 2) UNICO-Demanda Rural (the first call was launched in December 2022; budget: EUR 84.4 million) aimed at improving take-up of at least 100 Mbps broadband services, mainly in remote rural areas by charging affordable prices to end-users and subsidising all installation costs; 3) UNICO Bono Social (budget: EUR 30 million; launched in 2021) to temporarily stimulate vulnerable groups' broadband take-up (at least 30 Mbps) through connectivity vouchers; and 4) UNICO Demanda Bono PYME (budget: EUR 50 million; to be launched in 2023) to provide broadband internet access (at 100 Mbps) and related services to SMEs in Spain.

On market developments, several nationwide operators are deploying fibre access networks and competing to provide VHCN throughout Spain. There are also regional and wholesale-only operators which focus on rural areas. The 50/50 joint venture between two large mobile players (announced in March 2022) is currently under EU's antitrust evaluation and over-the-top (OTT) platforms continue to grow in terms of market share in the media and audiovisual sector.

Spain's achievement of the connectivity target is well on track regarding VHCN fixed connectivity, but efforts need to be continued regarding mobile 5G connectivity, because private investment in 5G seems to be losing momentum. However, coverage levels may be improved with 700 MHz deployments, given that the band was put out for tender in 2021 and there has not yet been time for deployments to be completed. 5G Stand alone is beginning to become a reality with several operator announcing its deployment. The outcome of the last two 5G auctions was lower than expected (especially for the 26 GHz band) and, apart from RRF-funding investments and 5G coverage obligations in the 700 MHz band, private investment is now relatively low. However, the alternative fixed operators enjoy regulated access to physical infrastructure, which allows massive investment in new VHCNs. In addition, structurally fragmented regulation regarding permits and procedures at a regional and local level in Spain appears to be reducing the effectiveness and efficiency of network deployment.

To help Member States overcome their connectivity gap (including for their outermost regions, such as the Canary Islands) the Connecting Europe Facility Digital finances projects with a co-financing rate of up to 70% (in the case of outermost regions). The Commission has supported the region in taking up such funding opportunities at EU level in line with its Outermost Regions Communication (COM(2022) 198 final). Three submarine cable projects from the Canary Islands, which have been selected for grants worth over EUR 37 million, were successful in the first round of CEF Digital calls that was completed in 2022.

Spain is planning and implementing some measures **to increase the share of production of semiconductors in Europe.** In May 2022, Spain approved the Strategic Project for Economic Recovery and Transformation (PERTE) on microelectronics and semiconductors (PERTE Chip). This PERTE (budget: EUR 12.25 billion) is intended to strengthen the industry's design and production capacity in Spain in order to promote national and EU strategic sovereignty in line with the Digital Decade and the proposed European Chip Act. The PERTE Chip will cover the whole industry value chain, from concept and design to production and energisation of ICT electronics manufacturing, and is based

around four lines of action: 1) boosting scientific capacity, with a special emphasis on R&D&I; 2) design strategy, strengthening the design ecosystem in Spain by developing fabless, pilots and digital skills and education networks; 3) setting up manufacturing plants to produce state-of-the-art (below 5 nm) and medium-range (over 5 nm) semiconductors; and 4) stimulating ICT manufacturing industry in Spain based on the assessment of industry's state of play. Spain participates in the IPCEI on Microelectronics and Communication Technologies that will promote a more resilient EU chips supply chain, from design to production, with the aim of reducing dependency on third countries and ensuring the EU market's needs and industry's long-term sustainability. Additionally, the country participates in the IPCEI on Microelectronics and Communication Technologies with 11 direct participants active in various fields (material, open-source design, equipment, packaging, connectivity, photonics).

Other measures will be launched in 2023, like the [Catedras Chip](#) programme (budget: EUR 80 million), which promotes the training of skilled professionals throughout the value chain of the microelectronics and semiconductor industry.

On the target of at least 10 000 climate-neutral highly secure edge nodes, Spain is expected to play an important role in the Next Generation Cloud infrastructure and Services IPCEI (IPCEI-CIS), which is part of the Multi-Country Project on Common Data Infrastructure and Services, and in which up to 12 Member States and more than 100 companies participate. This project is to develop and deploy innovative cloud and edge solutions that will contribute to building a European Common Infrastructure and Smart Processing Services, providing the next generation of advanced, distributed, secure, sustainable, and innovative cloud-to-edge capabilities. Spain is also collaborating with other Member States with a view to proposing numerous European Digital Infrastructure Consortia.

Spain is currently implementing several measures that can contribute to achieving the EU's first computer with quantum acceleration by 2025. In 2021, Spain launched the [Quantum Spain](#) programme (budget: EUR 22 million) under component 16 in Spain's RRP with the aim of strengthening the national quantum computing ecosystem and infrastructure by: 1) creating a high-performance quantum computer; 2) creating a remote cloud access service to the quantum computer; and 3) developing useful quantum algorithms to real life problems. As a result, in October 2022, the European High Performance Computing Joint Undertaking ([EuroHPC JU](#)) selected Spain to host one of the EU's six first quantum computers. The computer (budget: EUR 12.5 million, 50% co-financed by the EU and Spain) will be installed at the Barcelona Supercomputing Center – Centro Nacional de Supercomputación ([BSC-CNS](#)) – and will be integrated into the forthcoming MareNostrum 5 supercomputer. Spain also participates in the EuroQCI multi-country project, and will (within the EuroQCI-Spain programme) deploy quantum key distribution and quantum crypto-technologies in Spain and, notably, quantum communication nodes in Madrid and Barcelona.
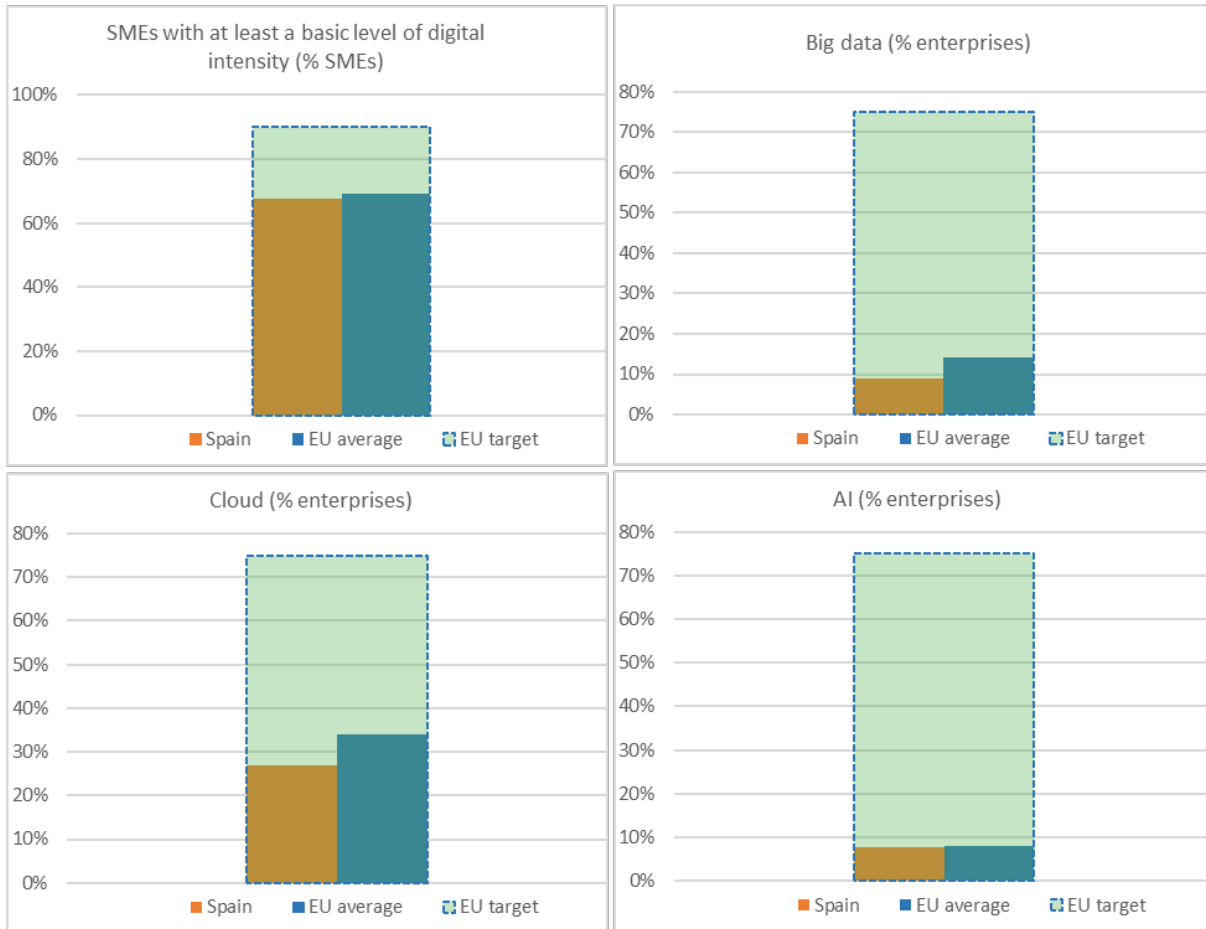
Long-impact measures and a comprehensive approach in new infrastructure initiatives (e.g. PERTE Chip, quantum computing and cloud) will further improve the country's digital ecosystem, creating economies of scale and maximising return on investments across value chains.

Spain should continue implementing its policies on digital infrastructure, in particular accelerating 5G coverage. It should accelerate the setting up of 5G ecosystems in cities, factories and relevant rural zones, and, in this context, encourage partnerships between innovative companies and large-scale companies providing the infrastructure to be deployed. Measures taken by Spain in the field of semiconductors and quantum computing should continue in order to help the EU to become a strong market player in these areas.

3 Digitalisation of businesses

	Spain			EU	EU
	DESI 2021	DESI 2022	DESI 2023	DESI 2023	2030 target
3a1 SMEs with at least a basic level of digital intensity	**NA**	**NA**	**68%**	**69%**	**90%**
% SMEs			2022	2022	
3b1 Electronic information sharing	**43%**	**49%**	**49%**	**38%**	
% enterprises	2019	2021	2021	2021	
3b2 Social media	**29%**	**39%**	**39%**	**29%**	
% enterprises	2019	2021	2021	2021	
3b3 Big data	**9%**	**9%**	**9%**	**14%**	**75%**
% enterprises	2020	2020	2020	2020	
3b4 Cloud[4]	**NA**	**27%**	**27%**	**34%**	**75%**
% enterprises		2021	2021	2021	
3b5 AI	**NA**	**8%**	**8%**	**8%**	**75%**
% enterprises		2021	2021	2021	
3b6 e-Invoices	**33%**	**33%**	**33%**	**32%**	
% enterprises	2020	2020	2020	2020	
3c1 SMEs selling online	**24%**	**25%**	**29%**	**19%**	
% SMEs	2020	2021	2022	2022	
3c2 e-Commerce turnover	**10%**	**9%**	**10%**	**11%**	
% SME turnover	2020	2021	2022	2022	
3c3 Selling online cross-border	**7%**	**9%**	**9%**	**9%**	
% SMEs	2019	2021	2021	2021	

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[4] Enterprises buying sophisticated or intermediate cloud computing services indicator, Digital Economy and Society Index (DESI) 2023 Methodological Note.

On the digitalisation of businesses, the percentage of SMEs with at least a basic level of digital intensity is slightly below the EU average (68 vs. 69%), although the Spanish authorities are making efforts to improve enterprises' digitalisation. The percentage of e-commerce turnover (10%) and online cross-border selling (9%) is in line with the EU average, while the number of SMEs selling online is constantly increasing (up to 29% in 2022). Spain is taking positive steps towards the integration of advanced technologies by enterprises, and according with the latest data provided by Spain[5], referring to 2022, 12.3% of enterprises use AI and 14.3% use Big Data for internal analysis. In addition, the Spanish Statistical Office published that 41,6% of enterprises were using social media in 2022. On e-Invoices, Spain's enterprises rank slightly above the EU average (33% vs. 32%) although the data is not updated since 2020. According to data from 2021, Spain is well above the EU average on electronic information sharing (49% vs. 38%) and social media presence (39% vs. 29%).

SMEs are particularly relevant in Spain, where almost 2.7 million SMEs (over 99.9% of the total) contributed 58% of total value added (EUR 288 138 million) and employed 8.5 million people (68% of the total workforce) in 2020[6]. SMEs' importance relevance and share in the country's economy means that reforms and investments to improve scalability and digitalisation of SMEs not only have a direct effect on SMEs' basic and advanced digitalisation but also have an indirect multiplier impact on other dimensions and targets (e.g. the number and quality of ICT specialists, infrastructure, and digital public services) and the overall economy of the country.

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[5] These figures were not included among the KPIs for this year's report as they do not correspond to the period of comparison between Member States (2020 and 2021), as Spain is the only country to have provided Eurostat with data for 2022.
[6] Eurostat.

Spain is currently implementing several measures to increase the number of EU enterprises taking up cloud computing, big data, and AI services in Spain.

Reforms and investments under component 13 'Support to SMEs' in Spain's RRP not only affect the specific target of SMEs' basic digital intensity but also affect the targets related to advanced digital technologies such as cloud computing, big data, and AI. In this context, Spain has launched: 1) the Kit Digital initiative (budget: EUR 3 067 million) to promote scalable, high-impact, and public-private collaboration mechanisms to accelerate the digitalisation of SMEs (especially micro-enterprises) and the self-employed; and 2) the Agents of Change programme (budget: EUR 300 million), whose bases were published in December 2022, and which will provide SMEs with grants to hire digital transformation experts. Both measures could complement and have a positive impact on this target.

In addition, some measures on AI have been launched recently under component 16 'Artificial Intelligence' in Spain's RRP and the National AI Strategy presented by Spain in December 2020. In 2022, Spain launched the Integration of AI into value chains programme (budget: EUR 105 million), which includes an action line to support SMEs integrating AI and robotisation into their value chains; and the Science and Innovation Missions on AI programme (budget: EUR 125 million), which will finance businesses' R&D&I projects to improve the competitiveness of Spanish enterprises and public-private cooperation (a minimum of EUR 20 million is reserved for SMEs' projects). Spain also approved in March 2022, the PERTE New language economy programme (budget EUR 1.1 billion) to take advantage of the potential of Spanish and the co-official languages as a factor of economic growth and international competitiveness in areas such as artificial intelligence, translation, learning, research and science.

On big data, Spain launched in March 2022 its Gaia-X Hub, which complements the work of the European Gaia-X in creating and coordinating the data-sharing ecosystem and helping enterprises solve business problems and create value in the data economy.

Regarding cloud technology, Spain is investing in both human capital and research, with a particular emphasis on women and knowledge transfer from academia to businesses. In 2022, under Span's RRP, the country launched the UNICO I+D Cloud programme (budget: EUR 43 million), which provides grants to support innovative cloud computing projects in public research centres and foundations as well as public universities. In the context of the IPCEI on Next Generation Cloud Infrastructure and Services (IPCEI-CIS), Spain is expected to actively contribute to increasing cloud uptake among businesses and to investing in new green-cloud infrastructure models (i.e. introducing sustainable operating models fully decarbonised with the use of natural refrigerants).

As regards the Digital Decade target of more than 90% of the EU's SMEs reaching at least a basic level of digital intensity, the above mentioned Kit Digital programme is a successful case not only in terms of design but also in terms of implementation and monitoring. All three calls (EUR 1.5 billion; EUR 500 million each) have already been launched and awarded: the first one (enterprises from 10 to fewer than 50 employees) in March 2022; the second one (enterprises from 3 to fewer than 10 employees) in September 2022; and the third one (companies from 0 to fewer than 3 employees) in October 2022. Most of the beneficiaries are part of the retail and hospitality sectors and the main actions were classified as follows: websites (20%), process management (15%), social media management (15%), business intelligence and analytics (9%), client management (8%), and cybersecurity (7%). The effects derived from this programme are not yet reflected in the indicators for monitoring the digitisation of companies, because the first call for the programme was launched at the end of the first quarter of 2022. However, the Kit Digital programme is expected to significantly boost Spanish SMEs' level of digitalisation. The Agents of Change initiative will support

companies from 50 to 249 employees to hire young ICT specialists to help them in their digital transformation.

Other initiatives such as Acelera PYME; Activa Industria; Generación Digital PYME; or Strengthening cybersecurity for citizens, SMEs, and professionals; are aimed at promoting digitalisation across SMEs and its ecosystem in Spain.

Spain is currently implementing several measures that can help increase the level of emerging companies and unicorns. In December 2022, Spain approved the Start-ups Law, which aims to boost the number of start-ups in Spain by streamlining requirements and providing considerable tax incentives. Spain has also launched some other initiatives to improve the start-up ecosystem in Spain such as: 1) Fondo Next Tech, which aims to promote the development of high-impact innovative digital projects and investment in scale-ups by strengthening public financing instruments, attracting international funds and boosting the venture capital sector; 2) Start-up Acceleration; and 3) Desafia San Francisco and Desafia Telaviv. Other measures are particularly focused on women entrepreneurs (e.g. the Female Entrepreneurship Attraction Programme 'The Break' or ENISA Emprendedoras Digitales).

The new Start-ups Law and subsequent initiatives in the field lay down the necessary pro-investment conditions to further develop Spain's start-ups ecosystem, which has increased from 10 to 14 unicorns in just a year, between 2021 and 2022[7]. Effective implementation of those reforms and investments will help Spain contribute to the achievement of the Digital Decade targets.

It is worth mentioning the network of European Digital Innovation Hubs (EDIHs) that is expected to make an important contribution to the EU's collective efforts to reach the Digital Decade targets in the digitalisation of businesses. Spain has 12 EDIHs funded under the Digital Europe programme (DEP) and Spain's RRP, and 13 EDIHs labelled with a 'Seal of Excellence' that are funded directly by Spain (also under its RRP).These relate to a wide range of technologies and sectors throughout Spain and will, for example, support SMEs in identifying investors; improving digital skills, modelling, and testing; and creating an ecosystem for innovation and networking.

Digitalising industries and businesses, with a specific focus on Spanish SMEs and micro-enterprises, will help in the transition towards the digitalisation of productive processes and distribution channels. Spain's RRP sets out a wide set of measures to improve SMEs' digitalisation that is having a very positive impact on SMEs' basic level of digital intensity. Despite the great success in the implementation of the Kit Digital initiative, the real impact will be seen from 2024 onwards as the software services are often provided via annual subscriptions. In addition, the Agents of Change programme that will be deployed during 2023 will ensure the solidification of the digital transformation of SMEs, as these will have a professional guiding them in the further take-up of cloud computing, big data or AI. This will improve SMEs' productivity and scalability, reach new markets, and fully benefit from the potential of the digital economy.

Best practice: the Kit Digital programme

The Kit Digital programme, under component 13 in Spain's RRP, is good benchmark not only because of its outcome and contribution to the Digital Decade targets of digitalisation of businesses (i.e. promoting public-private collaboration mechanisms to accelerate the digitalisation of Spanish SMEs, especially micro-enterprises and the self-employed) but also because of the timely and massive integration of cutting-edge technologies (e.g. AI, cloud computing, and big data) in its design,
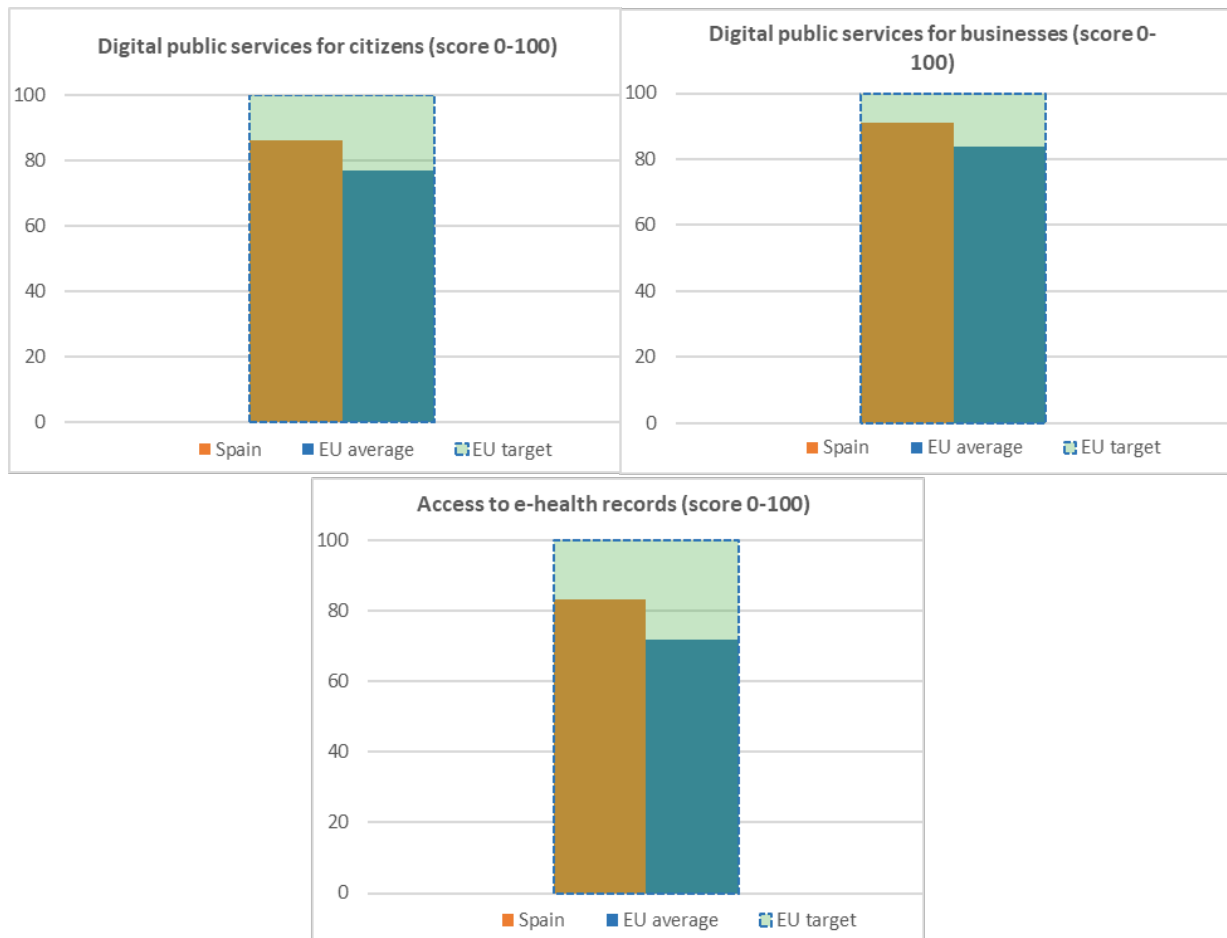
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[7] Dealroom.co

implementation, and monitoring.

Spain should continue implementing its policies concerning the digitalisation of businesses, notably it should continue supporting the development and deployment of advanced technologies, in particular, in SMEs, and to provide supportive framework conditions for start-ups and scale-ups.

4 Digitalisation of public services

	Spain			EU	EU
	DESI 2021	DESI 2022	DESI 2023	DESI 2023	2030 target
4a1 e-Government users % internet users	NA	NA	84% 2022	74% 2022	
4a2 Digital public services for citizens Score (0 to 100)	NA	87 2021	86 2022	77 2022	100
4a3 Digital public services for businesses Score (0 to 100)	NA	94 2021	91 2022	84 2022	100
4a4 Pre-filled forms Score (0 to 100)	NA	78 2021	83 2022	68 2022	
4a5 Transparency of service delivery, design and personal data Score (0 to 100)	NA	72 2021	73 2022	65 2022	
4a6 User support Score (0 to 100)	NA	86 2021	87 2022	84 2022	
4a7 Mobile friendliness Score (0 to 100)	NA	90 2021	92 2022	93 2022	
4b1 Access to e-health records Score (0 to 100)	NA	NA	83 2022	72 2022	100

Digital public services for citizens (score 0-100)

Digital public services for businesses (score 0-100)

Access to e-health records (score 0-100)

Spain performs well on e-Government and digital public services in the EU. It continues to update its services and infrastructure to bring them into line with rapid technological developments and the needs of people and businesses. In particular, Spain performs well above the EU average on the indicators measuring the number of internet users that engage with e-government services (84% vs. 74%), the reuse of information across administrations (83 vs. 68), and access to e-Health records (83 vs. 72). In addition, on transparency of service delivery, design, and personal data, and on user support, the country's score is also increasing (up to 73 and 87, respectively) above the EU average (65 and 84). On digital public services for citizens (86) and for businesses (91), Spain also performs above the EU average. The only indicator Spain scores slightly below the EU average is mobile friendliness (92 vs. 93), although Spain has improved (from a score of 90 in 2021). Making progress with **the interoperability of digital public services at national, regional and local levels, is a continuous challenge** for Spain because of the country's high administrative decentralisation (17 autonomous communities (regions), two autonomous cities and up to 8 131 municipalities).

Spain is currently implementing several measures that **will improve the level of the most demanded public services accessible online both for citizens and businesses.** Under the [Plan for the Digitalisation of Spain's Public Administration 2021-2025](), which further develops reforms and investments set out under Spain's RRP in component 11 'Modernisation of Public Administration', the country is developing and implementing important measures to improve: 1) digital transformation of the State administration; 2) high-impact projects for the public sector digitalisation and trust; and 3) the digital transformation and modernisation of the Ministry of Territorial Policy and Public Function as well as the regional and local administrations.

In 2022, Spain launched the App Factory programme for the development of mobile applications and services for citizens, thus facilitating a more fluid relationship between citizens and administration. As part of this measure, the Citizen's Folder App was launched in December 2022 to offer all its services through a new mobile application (it has already been downloaded by over 1 400 000 people and the service has been accessed by 1 900 000 different users). Spain launched two calls for tender (budget: EUR 391.4 million) in 2021 and 2022 to improve Spain's local entities' modernisation and digitalisation, and a third call (budget: EUR 145.5 million) is planned for 2023. In July 2022, Spain confirmed its commitment to launching an inter-administrative digital ecosystem plan that will facilitate digital interaction across all entities participating in the Sectoral Conferences framework. In November 2022, the country launched the National Cloud Services Strategy for Public Administrations that will improve cloud services across all levels of the administration, based either on its own initiatives or through cooperation with private entities. The Spanish digital strategy encourages its public entities to use innovation procurement as a means to modernise public services at all levels across the country. Finally, the nationwide GovTechLab strategy, which is intended to incorporate innovation and advanced technologies for the transformation of public services, is expected to be rolled out in 2023 and the territorial networks of technological specialisation (RETECH) initiative will in this context articulate various regional projects on digital transformation. Spain has also developed a robotic process automation (RPA) and the Intelligent Automation Service (SAI), which will improve the services and processes of the State administration through intelligent automation technologies.

Under the Digital Europe programme, Spain is also participating in several multi-country projects: 1) Digital Credentials for Europe (DC4EU); 2) The European Blockchain Services Infrastructure - Nodes Expansion (EBSI-NE); and 3) GovTech Incubator.

Spain continuous to be active in cybersecurity. The National Security Scheme focuses in national cybersecurity and promotes the cybersecurity capabilities of public administrations and the private sector (particularly, providers of technology to the public sector). In 2022, the government approved the National Cybersecurity Plan, a new National Security Framework and the deployment of the Cybersecurity Operation Centres of the General State Administration; and the National Cryptologic Centre promoted the National Network of SOCs to integrate and coordinate the SOCs of the public sector in the agile and effective exchange of information in order to improve capacity to detect and respond to possible cyber incidents.

As regards the target of **100% of EU citizens having access to their electronic health records**, under component 18 of Spain's RRP 'Modernisation of the National Health System', Spain is undertaking a health data lake to collect health data, from different information systems, and to process and analyse it so as to improve a number of areas, such as diagnosis and treatments; health risk predictions; identification of patterns; and citizens' access to their health records. In addition, Spain has participated in the EU initiative My Health@EU since its creation in 2011. This initiative is aimed at ensuring citizens' continuity of care, access to safe and high-quality healthcare within the EU, and promotion of a European e-prescription interoperability system. In the particular case of MyHealth@EU digital health services, Spain is the largest EU Member State incorporated into the EU Patient Summary and ePrescription/eDispensation services. Spain's healthcare system is highly decentralised and access services to electronic health records are provided at a regional level, although the Ministry of Health does provide harmonisation criteria for national interoperability in three key services: the master patient registry of the NHS (TSI-SNS), the national ePrescription/eDispensation system (RESNS); and the national healthcare records exchange system (HCDSNS). However, health-related data availability may differ between different regions. People in Spain can access their electronic health records through an online portal by authenticating

themselves with a (pre)-notified eID that, complies with the eIDAS Regulation, but a dedicated mobile app is not yet available. Dedicated mobile apps are available in some regions, while portals allowing access to the national healthcare records exchange systems exist in all regions.

Concerning the target of **100% of EU citizens having access to secure electronic identification (eID)**, Spain's *Documento Nacional de Identidad electrónico (DNIe)* scheme has been certified with the 'high' level of assurance. Related to the ID, Spain participates in the [DC4EU consortium, which](#) will test the reference wallet for its use with educational and professional diplomas and social security documents, as the country is coordinating their pilot project.

Promoting the complete automation of public services will lead to more efficient and effective public services, thus reducing administrative costs. Spain continues to make progress in the digitalisation of public services and their usability, quality, and accessibility to enterprises and people in Spain. In this regard, Spain provides a one-stop shop portal, the [General Access Point of the Administration](#), where enterprises and citizens can interact with the administration regardless of its level and jurisdiction or place. This facilitates and improves public interaction.

> ***Spain should continue implementing its policies to digitalise public services***. *Notably, it should continue to increase its efforts to connect additional kinds of healthcare provider to electronic health records until full coverage is achieved. Spain should also continue taking measures to ensure that a comparable quality of service and completeness of electronic health data is provided at regional level.*